

Extended Response Task

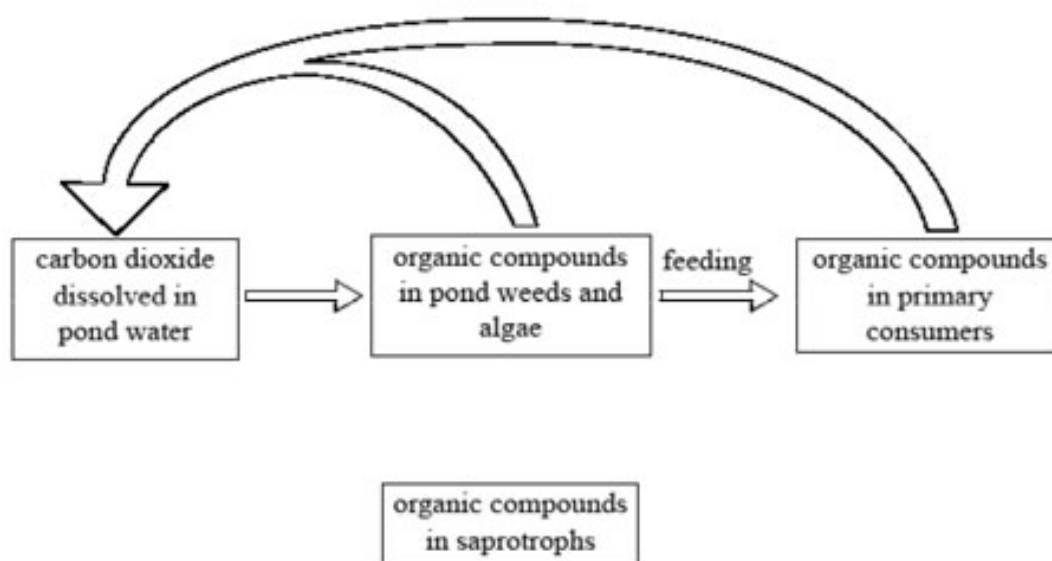
Teacher Directions

This task is designed to provide students an opportunity to practice a modified version of a Diploma Program exam paper 2 question. It contains a short answer question as a Part A question and an extended response. An actual Paper 2 would have more questions in the Part A section, a database question and would range over a wider area of the curriculum (more than one unit) and would have choice in the extended response section as it too ranges over the entire curriculum.

While this might be suitable as a test questions for very experienced students who have already had practice with this format, it is probably best used as an assignment or group activity for formative assessment to allow students to gain experience in a low risk setting.

Student directions

1. The diagram below is part of a carbon cycle diagram for an ecosystem in a pond.



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Part A:

1.
 - (a) State the names of the processes that
 - (i) convert carbon dioxide into organic compounds in pond weeds and algae.
 - (ii) convert organic compounds in pond weeds, algae and primary consumers into carbon dioxide.
 - (b)
 - (i) Draw arrows on the diagram above to show how the saprotrophs obtain carbon.
 - (ii) Explain the role of saprotrophs in recycling carbon.
 - (c)
 - (i) Draw a box on the diagram in an appropriate position, labeled organic compounds in secondary consumers.
 - (ii) Draw arrows to show the links between secondary consumers and other parts of the carbon cycle.

There has been a significant increase in the concentration of carbon dioxide in the Earth's atmosphere during the last fifty years.

- (d)
 - (i) Suggest two reasons for this increase in atmospheric carbon dioxide concentration.
 - (ii) Suggest one effect of an increase in carbon dioxide concentration on organisms in a pond. Include in your answer the reason for the effect and the type of organisms that are affected.

Part B:

2. Define the Precautionary Principle as it could apply to the management of an ecosystem. Evaluate this approach to managing an ecosystem as it would apply to energy production and CO₂ emissions.

Remember, the command term define means to give a precise meaning of a word, phrase or physical quantity, while the command term evaluate means to assess the implications and limitations.

Support material

Markschemes/markings notes:

1.
 - a)
 - i) photosynthesis (1 mark)
 - ii) (cell) respiration (1 mark)
 - b)
 - i) only arrows from both pond weeds and algae box and from primary consumers box pointing to saprotrophs box (1 mark)
 - ii) Explain the role of saprotrophs in recycling carbon. (2 marks)

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- saprotrophs break down/decompose / organic matter/organisms/ compounds;
- release enzymes into organic matter;
- release carbon dioxide; (do not accept (elemental) carbon)
- produce carbon dioxide by (cell) respiration;
- carbon dioxide can then be used by plants / autotrophs

(c) Draw a box on the diagram in an appropriate position, labeled organic compounds in

- secondary consumers. Draw arrows to show the links between secondary consumers and other parts of the carbon cycle. (2 marks)
- arrow from primary consumer box to secondary consumer box;
- only arrows from secondary consumer box to saprotrophs and to carbon dioxide;
- There has been a significant increase in the concentration of carbon dioxide in the Earth's atmosphere during the last fifty years.

d)

i) Suggest two reasons for this increase in atmospheric carbon dioxide concentration. (2 marks)

- burning/use of fossil fuels / example;
- burning forests;
- destruction of autotrophs that use carbon dioxide / deforestation;

Do not accept "pollution" unqualified.

ii) Suggest one effect of an increase in carbon dioxide concentration on organisms in a pond. Include in your answer the reason for the effect and the type of organisms that are affected. (2 marks)

- increased growth/photosynthesis by plants/pond weeds/algae/autotrophs/producer /eutrophication;
- carbon dioxide used in photosynthesis / photosynthesis provides raw materials for growth;
- effect of lower pH of water on a named type of organism (e.g. some plants cannot grow in acidic water);
- increased carbon dioxide concentration makes water more acidic;

For those candidates who have interpreted increase in carbon dioxide concentration to mean atmospheric carbon dioxide, include these marks:

- increased atmospheric carbon dioxide leads to global warming;
- global warming causes pond warming;
- pond warming may promote growth of aquatic vegetation;
- pond warming may kill intolerant plant/animal species;

2.

a) Define the Precautionary Principle as it could apply to the management of an ecosystem. (4 marks)

b) Evaluate this approach to managing an ecosystem as it would apply to energy production and CO₂ emissions. (6 marks)

Remember, the command term define means to give a precise meaning of a word, phrase or

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physical quantity, while the command term evaluate means to assess the implications and limitations.

a)

The Precautionary principle requires that individuals or groups who are planning to make changes to an ecosystem to harvest a resource, produce materials, build on a site, generate energy, et cetera, first prove that the disturbance will do no long term damage to the quality of the ecosystem. This puts the burden of proof on the developers prior to development, rather than on opponents to a plan or monitoring and mitigating after development.

b)

- would slow down development of resources
- would cost more to developers
- would prevent damage rather than plan mitigation
- may slow the delivery of services to consumers
- may cost jobs
- may harm developing or resource based economies
- may make conservation/alternate technologies more competitive
- may cause political pressure from areas dependent on resource development
- slower development may slow economic growth
- other reasonable answers

Subject:

Biology

DP Component & Criteria:

Extended Response Questions/Paper 2 and 3

Component type:

Internal

MYP Criteria:

Group 4 / Sciences